

- 25 -

CLAIMS

1. A gallium nitride-based semiconductor device having a p-type layer that is a gallium nitride compound semiconductor layer containing a p-type impurity and exhibiting p-type conduction, wherein the p-type layer comprises a top portion and an inner portion located under the top portion and wherein the inner portion contains the p-type impurity element and, in combination therewith, hydrogen.
2. A gallium nitride-based semiconductor device according to claim 1, wherein the p-type impurity is incorporated in the p-type layer by means of doping or ion injection.
3. A gallium nitride-based semiconductor device according to claim 1 or claim 2, wherein the inner portion of the p-type layer has a ratio of atomic concentration of the hydrogen to that of the p-type impurity of about 1:1.
4. A gallium nitride-based semiconductor device according to claim 1 or claim 3, wherein the inner portion of the p-type layer has a percent thickness of 40% to 99.9% with respect to a total thickness of the p-type layer.
5. A gallium nitride-based semiconductor device according to claim 4, wherein the inner portion of the p-type layer has a percent thickness of 70% or more with respect to the total thickness of the p-type layer.
6. A gallium nitride-based semiconductor device according to any one of claims 1 to 5, wherein the top portion of the p-type layer has a hydrogen content that is 1/3 or less the amount of the hydrogen contained in the inner portion.

- 26 -

7. A gallium nitride-based semiconductor device according to any one of claims 1 to 5, wherein the top portion of the p-type layer has a hydrogen content that is 1/2 or less the amount of the hydrogen contained in the inner portion.

5 8. A gallium nitride-based semiconductor device according to any one of claims 1 to 5, wherein the top portion of the p-type layer has a hydrogen content that is 2/3 or less the amount of the hydrogen contained in the inner portion.

9. A gallium nitride-based semiconductor device according  
10 to any one of claims 1 to 5, wherein the top portion of the p-type layer has a hydrogen content that is less than the amount of the hydrogen contained in the inner portion.